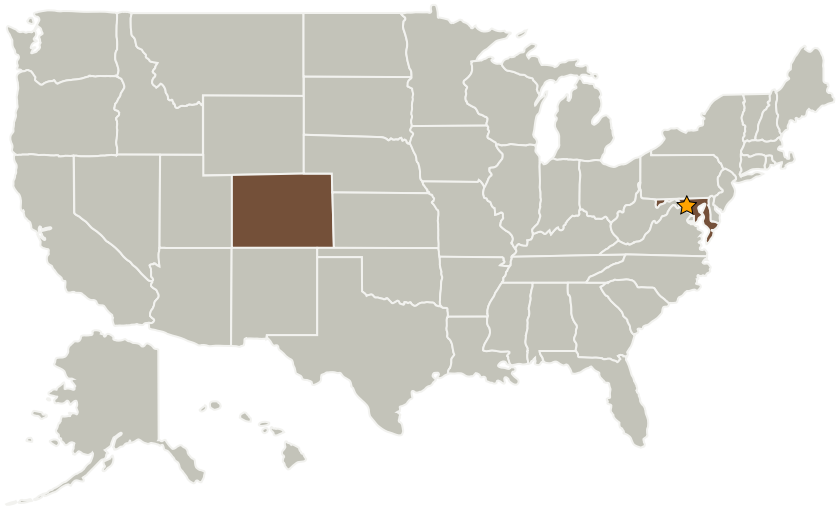
Cloud Micro-sensors for Applications on Small UAVs and Balloons, Phase II

Completed Technology Project (2004 - 2007)

Project Introduction

One of the key areas of study of NASA's Earth Science enterprise is the role played by clouds in climate change. The duration of conventional research aircraft is limited so that long-term measurements required to validate satellite observations are not practical. Small uninhabited aerial vehicles (UAVs) and tethered balloons, however, are now capable of making sustained, long-term (30 hr) measurements, so that data sets can be collected that provide much better statistical comparisons with results from satellite retrieval algorithms. In Phase I we produced system designs and performed laboratory tests to investigate the feasibility of manufacturing a small, lightweight (< 1.5 Kg) cloud particle imager, called a Micro-CPI, for application on the Aerosonde Piccolo, the most-widely used small UAV for weather research. In Phase II, Micro-CPIs will be fabricated and flight-tested on the Aerosonde UAV at the Aerosonde facility located at the NASA Wallops Island Research Facility. The Aerosonde Corporation has agreed to commit technical consulting and materials to support the Phase II effort. The Micro-CPI will measure the size distributions of both water and ice particles. The extremely high resolution images (3-micron) of ice crystals can be used to determine their shape and light-scattering properties, information that is crucial for reliable validation of satellite retrievals used to monitor global climate change.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
SPEC, Inc.	Supporting Organization	Industry	Boulder, Colorado

Primary U.S. Work Locations	
Colorado	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.1 Situational and Self Awareness
    - TX10.1.1 Sensing and Perception for Autonomous Systems